"A Satisfactory Philosophy—
The Legacy of Richard Feynman"
MIT Doolittle Award Remarks

Thursday, 19 March 2009

General Norty Schwartz

Thank you for that kind introduction. It is such a privilege to be here with you. It is also a distinct honor to join you in memory of General Jimmy Doolittle and his remarkable contributions to Airpower. He was arguably the greatest Airman of the 20th Century, and we still enjoy the benefits of his work today, as well as his legacy of *integrity, service* and *excellence.* His studies at MIT were no small part of his success in life, and it is good to see a handful of uniformed scholars here with us tonight in fellowships and advanced degree programs. I am confident the Air Force, each of your Services, and the Nation will reap a great reward from the time and effort you invest here. Thank you, each and every one of you, for all that you do to make this program so successful for national defense. I could not be more proud of all you do.

The name "Jimmy Doolittle" brings to mind all kinds of thoughts of heroism, innovation and record-breaking success. I cannot think of a more worthy legacy than his--from the famously harrowing raid on Tokyo that bears his name, to the disciplines of instrument flight that are still used today, to the innovation of aircraft fuel that made war-winning, high-performance aircraft a reality, to record-breaking performances in early air races, to his remarkable engineering and scientific work in both government and industry. Jimmy Doolittle, Medal of Honor recipient, Mackay Trophy winner, aviation pioneer, scientific innovator and Airman, he crafted an airpower legacy second-to-none, and a legacy so powerful that his name has become synonymous with personal valor and intrepidity in the face of extreme hazard--and making it all look too easy.

Since this event has taken place for some 20 years now, I suppose the subject has been well treated over time. So I would like to draw your attention to another great MIT-graduate whose work helps illuminate precisely why Doolittle's legacy is so important. I would like to reflect tonight on the legacy of Dr. Richard Feynman. Some of you might be surprised to know that Dr. Feynman's biography was required reading for years at the Air Force Academy. Among others, the physics department used the text to teach students the importance of innovative thinking and the vitality of unconventional approaches to problem solving. His story is truly inspiring and full of valuable lessons.

Feynman made extraordinary contributions to national defense after his time at MIT with his work on the Manhattan Project. For it is here where he stood out as a young scientist to such a degree that Niels Bohr himself sought him out for challenging personal discussions. Throughout his career he made extraordinary contributions to the study of physics in various fields, especially his research on the theory of quantum electrodynamics that earned him the Nobel Prize, and perhaps more intriguingly, his ground-breaking innovations in nanotechnology and quantum computing--the results of which I suspect mankind is yet to fully realize. But apart from his remarkable contributions in theoretical research and applied science, Feynman communicated a vision for innovation and knowledge I find particularly insightful. It might surprise you to hear me say that I find compelling his argument for "a satisfactory philosophy of ignorance." I think it is an argument that helps explain what Doolittle was able to accomplish, and what we must accomplish together as we prepare to face tomorrow's challenges.

Feynman once made this observation in a speech he called "The Value of Science" where he reflects that "through all ages of our past, people have tried to fathom the meaning of life if we take everything into account--not only what the ancients knew, but all of what we know today that they didn't know, then I think we must frankly admit that *we do not know*"[1] He used this simple point as the beginning of a very sophisticated argument about America's founding fathers and the age of reason. He argued that our system of government was established to function much as we practice the sciences--that our political system is based upon a self-correcting process of trial-and-error where the best ideas are retained and the others tossed out, or at least tossed out until needed later. He reasoned that no one person has the whole answer, but that the best answers are discovered through a collaborative process of design-and-test and cross-examination. Feynman believed that "if we want to solve a problem that we have never solved before, we must leave the door to the unknown ajar." I think this point suggests that we must not allow ourselves to become constrained in our thinking--whether by material constraints, tribal interests or parochial concerns, or by the darkness of human prejudice in favor of the way things have always been done all too conveniently for a few. I think this is what he meant by a "philosophy of ignorance"--it is really a philosophy of intellectual integrity.

When we face new challenges as leaders and thinkers it is OK to admit that we don't know all the answers and that we need to find new solutions to match an unfolding reality. In fact, it is critical that we *do* admit it when it's the *truth.* For as Feynman points out, "if we

[1] Richard P. Feynman, *What Do You Care What Other People Think?*, Norton Press, 2001, p. 240-248

suppress all discussion, all criticism, proclaiming 'this is the answer, my friends; man is saved!' we will doom humanity for a long time to the…limits of our present imagination." I think this point is critical to our understanding of what innovation means and why the work of both Doolittle and Feynman was so unprecedented and extraordinary. For these men possessed the true qualities of explorers, pioneers and scientists of the purest type. They threw themselves at extraordinary challenges and arrived at extraordinary solutions--not recklessly or foolishly, but with reason and a determination to do the hard work necessary to derive feasible, acceptable answers. Doolittle's meticulous approach to aviation and engineering was no less genius than Feynman's approach to theoretical physics, and both of their lives reveal an important truth about the meaning of life--by living lives of great meaning, serving wherever needed, in any capacity, whatever the need. It comes as no surprise to me that they both hail from MIT, and it would not surprise me to learn that they both developed and honed these skills here early in their studies. That notion pleases me all the more as I stand here and look out at all your faces knowing that each of you are preparing today to tackle the extraordinary challenges of tomorrow.

You have my highest confidence, and you have this modest challenge from me: The future belongs to those who show up for it, and our nation needs each and every one of you to make sure that we are ready for some of the most competitive environments the world has ever known. The challenges of tomorrow will perhaps make those of yesterday seem small by comparison. We will need thinkers who serve in the finest traditions of Doolittle and Feynman and many others from here, and elsewhere. It is up to each and every one of us to bring the sharpest thinking, the finest solutions, and the most engaging approaches to problem solving--with the intellectual rigor that embraces uncertainty and acknowledges doubt at the outset of discovery. All of this supported with honesty that Feynman described so well saying, "our freedom to doubt was born out of a struggle… to question--to doubt--to not be sure… herein lies a responsibility to society."

As we remember the accomplishments of these great scientists, we do well to consider exactly what made them great and to distill the larger lessons of their experiences into something we can use in the challenges of today and tomorrow. Not the least of these lessons, I think, is the idea that we must develop in ourselves the capacity to embrace uncertainty and seemingly intractable problems. I am certain that all of you here at MIT are working to do just that, and my commitment to you is that your Air Force will do the same. We will develop leaders for the future--like those studying here--who are comfortable with uncertainty and have the integrity to

acknowledge that they do not know the answers--at least, for some, not yet. We will grow leaders who have the courage to find the best answers regardless of their origin, and who reap the benefits of our inherent diversity. I commit to you that the Air Force will be your partner in doing this for our Nation's defense because it is wise, and because it is *right.* I could not be more proud to partner with you in this way; I could not be more proud of the work we are doing together. Thank you all, once again, for this distinct honor and for all you do to secure our great Nation. Thank you again for the opportunity to join you this evening and be part of such a tremendous event and to accept this very prestigious award on behalf of your Air Force. It is truly a privilege to receive this honor and to see you all. The great contributions you make every day to our Services and to our Nation make us all very proud, and I am so honored to be in your presence. Thank you.